Proposed Claims

1. An improved gerotor pump of the type having a gerotor set comprising an inner rotor having N outwardly extending lobes with N approximately circularly shaped grooves therebetween being in mesh with and, in response to rotational motion of a drive shaft, rotationally driving an eccentrically disposed outer rotor about an eccentricity offset rotation axis located along a preferred eccentricity axis, the outer rotor being formed with N + 1 inwardly extending circularly shaped elements whereby N + 1 pumping chambers are formed between the inwardly and outwardly extending circularly shaped elements and lobes and one groove of the inner rotor, a floating ring wherein the outer rotor is located within the floating ring, a housing, a gerotor pump cavity comprised within the housing and comprising orthogonal housing guide features for locating the floating ring in a lateral direction, housing ports, and fluid commutation ports located on respective inlet and outlet sides of the gerotor pump in a symmetrical manner about a preferred eccentricity axis in either of the floating ring or at least one of first and second sides of the gerotor cavity for selectively conveying fluid between the housing ports and the pumping chambers, wherein the improvement comprises:

means for forcibly positioning the outer rotor against the inner rotor along the eccentricity axis at the gerotor set's in-mesh position.

2. The improved gerotor pump of claim 1 wherein guide means are provided for constraining the floating ring in the roll direction.

3. The improved gerotor pump of claim 2 wherein the means for forcibly positioning comprise piston means bearing against the floating ring at a position juxtaposed to the gerotor set's in-mesh position.

4. An improved method for supporting a gerotor set in a gerotor pump comprising a floating ring, wherein the method comprises the steps of:

applying force to the floating ring along a preferred eccentricity axis of the gerotor pump toward the gerotor set's in-mesh position; and

hydrodynamically coupling that force to the space between the floating ring and the outer rotor of the gerotor set, whereby the outer rotor is forcibly positioned against the inner rotor.

5. The improved gerotor pump of claim 2 wherein the means for forcibly positioning comprise means for selectively applying the higher pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's in-mesh position and the lower pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's out-of-mesh position.

6. The improved gerotor pump of claim 5 wherein the means for selectively applying the higher pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's in-mesh position and the lower pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's out-of-mesh position respectively comprise a first pin disposed in a first laterally offset slot formed on the lower pressure side of a preferred eccentricity axis of the gerotor pump in the portion of the periphery of the floating ring juxtaposed to the gerotor set's in-mesh position, and a second pin disposed in a second laterally offset slot formed on the higher pressure side of the preferred eccentricity axis in the portion of the periphery of the floating ring juxtaposed to the gerotor set's out-of-mesh position.

7. The improved gerotor pump of claim 6 wherein first and second pockets are respectively formed symmetrically about the eccentricity axis on the inner surface of the floating ring at positions juxtaposed to the in-mesh and out-of-mesh positions of the gerotor set and first and second holes are formed in the floating ring for respectively coupling the first and second pockets to the higher and lower pressure valued ones of the inlet and outlet fluids so impressed against the floating ring in order to hydrostatically force the outer rotor against the inner rotor at the gerotor set's in-mesh position.

8. The improved gerotor pump of claim 5 wherein the means for selectively applying the higher pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's in-mesh position and the lower pressure valued one of the inlet and outlet fluids against the floating ring at a position juxtaposed to the gerotor set's out-of-mesh position respectively comprise a first set of pins each disposed equidistantly from the

preferred eccentricity axis in a first set of offset slots respectively formed in the portion of the periphery of the floating ring juxtaposed to the gerotor set's in-mesh position wherein means are provided for fluidly coupling the first set of slots one-to-another, and a second set of pins each disposed equidistantly from the preferred eccentricity axis in a second set of offset slots respectively formed in the portion of the periphery of the floating ring juxtaposed to the gerotor set's out-of-mesh position wherein means are provided for fluidly coupling the space between the second set of slots to the lower pressure valued one of the inlet and outlet fluids.

9. The improved gerotor pump of claim 8 wherein first and second pockets are respectively formed symmetrically about the eccentricity axis on the inner surface of the floating ring at positions juxtaposed to the in-mesh and out-of-mesh positions of the gerotor set and first and second holes are formed in the floating ring for respectively coupling the first and second pockets to the higher and lower pressure valued ones of the inlet and outlet fluids so impressed against the floating ring in order to hydrostatically force the outer rotor against the inner rotor at the gerotor set's in-mesh position.

10. An improved method for supporting a gerotor set in a gerotor pump comprising a floating ring that has been constrained in the roll direction, wherein the method comprises the steps of:

conveying fluid pressures representative of instant fluid pressures present in each of the gerotor set's pumping chambers radially outward to the edges of the juxtaposed portions of the space between the outer rotor of the gerotor set and the floating ring;

applying the higher valued one of the fluid pressures over a selected portion of the in-mesh end of the floating ring and the lower valued one of the pressures over a selected portion of the out-of-mesh end of the floating ring, thereby applying force to the floating ring along a preferred eccentricity axis of the gerotor pump toward the gerotor set's in-mesh position; and

hydrostatically coupling those pressure values to selected portions of the space between the floating ring and the outer rotor, whereby the outer rotor is forcibly positioned against the inner rotor.